

Space News Roundup

Vol. 20 No. 20

October 16, 1981

National Aeronautics and Space Administration

Shuttle Update

November 4 is the planned launch date for STS-2 following successful completion of repairs to the Orbiter Columbia after the oxidizer spill in September.

Technicians made better progress than expected in replacing the 379 tiles which had come loose as a result of the Sept. 22 spill of nitrogen tetroxide.

The oxidizer was being recirculated this week and filtered to remove traces of iron nitrate, the substance which caused the quick disconnect valve to fail resulting in the spill.

Reloading of hypergolics was scheduled to begin near the end of this week.

Major Restructuring Seen At NASA Headquarters

NASA Administrator James M. Beggs announced today that the NASA Headquarters will be reorganized effective Nov. 9.

In making the announcement of the reorganization Beggs said: "The specific goals of the new proposed organization are to assure the proper delegation of authority to all line managers, set forth a clear distinction between line and staff, and a simplification and clarification of field centers' reporting lines."

Changes include the combination of the Office of Space Science and the Office of Space and Terrestrial Applications into a new Office of Space Science and Applications and the establishment of an Office of Management which will handle a part of the functions now performed by the

Kleinknecht Leaves JSC

Former Mercury Chief Joins Contractor

Kenneth S. Kleinknecht, assistant manager of the Space Shuttle Orbiter Project Office at the NASA Johnson Space Center, will leave federal service in October to join Martin Marietta Aerospace Denver Division.

His 39-year career with NASA and its predecessor agency, the National Advisory Committee for Aeronautics (NACA), spans wartime and post-war aircraft program and on into the manned space flight era.

"I've enjoyed every minute of my 39 years with NACA and NASA," said Kleinknecht who begins a new career October 5 with the Martin Marietta Aerospace MX missile launcher program. "I'm proud to have been part of JSC and I wish full success to JSC

and all of NASA in the future. Our latchkey will be out in Denver for all our old friends who want to come up to the Rockies skiing, hunting of fishing."

Kleinknecht joined NACA's Lewis Research Center in Cleveland in 1942 after earning his bachelor's degree in mechanical engineering at Purdue University. In 1951 he transferred to the NACA Flight Research Center as aeronautical research scientist on the X-1, D-558 and the X-15 rocket research aircraft until 1959, when he joined the Space Task Group at NASA Langley Research Center. Space Task Group evolved into the Manned Spacecraft Center which was renamed the Lyndon B. Johnson Space Center in 1973.

Kleinknecht was manager of Project Mercury, the first U.S. manned space flight program. He became deputy Gemini Program manager at the end of Mercury, and in 1967 was named command and service module manager for the Apollo Spacecraft Program. From 1970 to 1974, he was manager of the Skylab Program in which three crews of three astronauts spent a total of 171 days aboard the nation's first space station.

He became JSC Director of Flight Operations in 1974, and assistant manager of the Space Shuttle Orbiter Project in 1976. Kleinknecht spent two years as a NASA Headquarters representative to the European

Space Agency (ESA) in Paris before returning to JSC as Orbiter 102 (Columbia) vehicle manager in charge of completion of Columbia's manufacture and thermal protection system (heatshield tile) modifications prior to the successful first orbital test flight in April 1981.

Kleinknecht has been on temporary appointment as a rehired annuitant since February 28, 1980 when he retired from federal service.



Kenneth Kleinknecht

Spacelab Experiment Hardware Shipped from JSC to Launch Site

The first major piece of experiment hardware for use in Spacelab 1, the first flight of a multi-national scientific laboratory to be carried into orbit aboard the Space Shuttle, has been shipped to the launch site from JSC.

The life sciences mini-lab, a double rack of experiment equipment plus stowage equipment, was shipped last week to the Kennedy Space Center, Florida, where it will undergo checkout and integration in preparation for the flight now planned for fall, 1983.

Spacelab is a reusable, modular scientific research facility that will be carried in the payload bay of the Space Shuttle Orbiter. It is being developed for NASA by the European Space Agency in cooperation with the Marshall Space Flight Center, Huntsville, Ala. Marshall is also responsible for managing the first three Spacelab missions.

The JSC developed mini-lab will allow scientists aboard Spacelab to conduct a variety of experiments to test the effects of space conditions on living organisms.

Included in the life sciences mini-lab are two human blood experiments, two relating to the vestibular system and one on plant growth. Two other experiments coordinated JSC to fly on the same mission will be installed in the vehicle near flight time. They are a radiation dosimetry study and an experiment on circadian rhythms.

Other scientific disciplines to be represented on the first Spacelab flight include atmospheric physics, solar physics and astronomy, space plasma physics and material science and technology.

Program Procurement Division Chief Dies

Stephen D. Armstrong, Chief of the Program Procurement Division, died October 7. He was 57.

Mr. Armstrong came to Johnson Space Center in July 1961, from a procurement management position with the Air Force. From 1971 to December 1978, Mr. Armstrong was Chief of the Shuttle Spacecraft Procurement Branch. In December 1978, he was selected as Chief of the Program Procurement Division.

During his 34 years of Government service, he was associated with virtually all aspects of the procurement of the Mercury, Gemini, Apollo, and Shuttle Programs. As Chief of the the Program Procurement Division he directed the procurement management activities for the Shuttle Program, other flight hardware, and advanced Research and Technology procurement.

He is survived by his wife, Barbara, of La Porte, two sons and one daughter.

Substation Fire Cuts Power At Center

An electrical fire Saturday morning in Building 221, the major on-site electrical substation supplying power to JSC, resulted in a power loss to several buildings on site and damaged about 10 percent of the control system in that substation.

According to Operations Safety Chief Charles Rice, the fire at 7:14 a.m. Saturday resulted from a ground fault in one of nine buildings which remained without normal power Wednesday. Those buildings were 1, 2, 3, 13, 14, 15, 16, 16A and 17. Emergency generators were supplying power to most of those Wednesday morning.

Many employees were sent home Tuesday after they reported to work and found their offices without lights or air conditioning.

Electricians Wednesday were attempting to track down the location of that ground fault which must be corrected before the system can be brought back on line.

Office of Management Operations and some of the functions presently under the NASA Comptroller. This office will support the program offices in their management of research and development and institutional resources.

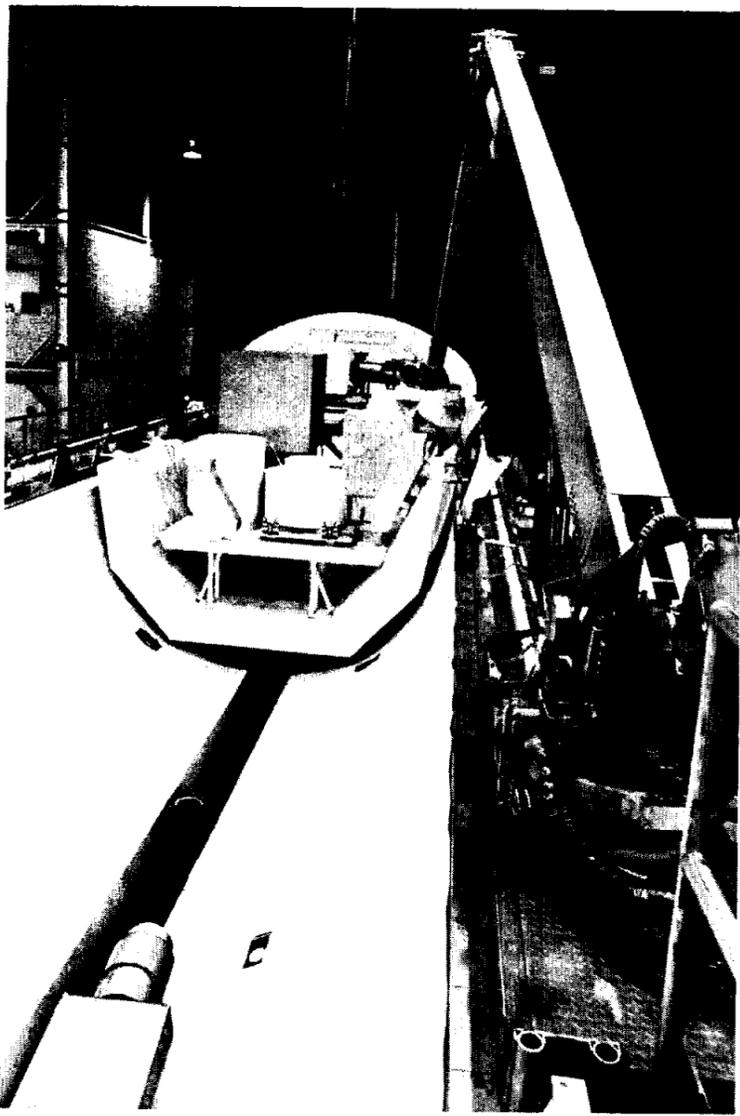
In addition to the new Office of Space Science and Applications, program offices will be the Office of Aeronautics and Space Technology, the Office of Space Transportation Systems, the Office of Space Transportation Operations, and the Office of Space Tracking and Data Systems.

The program office Associate Administrators will be the major line officers of NASA, and the NASA Center Directors will report to Headquarters through them as follows:

- Jet Propulsion Laboratory, Pasadena, Calif., and Goddard Space Flight Center, Greenbelt, Md., will report to the Associate Administrator for Space Science and Applications;
- Ames Research Center, Mountain View, Calif., Langley Research Center, Hampton, Va., and Lewis Research Center, Cleveland, will report to the Associate Administrator for Aeronautics and Space Technology; and
- Johnson Space Center, Houston, Kennedy Space Center, Fla., Marshall Space Flight Center, Huntsville, Ala., and the National Space Technology Laboratories, Bay St. Louis, Miss., will report to the Associate Administrator for Space Transportation Systems.

The Administrator's staff will be made up of Chief Engineer, Comptroller, Procurement, Equal Opportunity, External Relations, General Counsel, Inspector General, Legislative Affairs, the Associate Deputy Administrator and several Assistants to the Administrator.

Between now and Nov. 9, appropriate Office Heads and a Reorganization Working Group, led by NASA General Counsel S. Neil Hosenball, will develop the particulars with respect to functional and personnel changes and a Reorganization Steering Committee led by Deputy Administrator Dr. Hans Mark will review the plans and recommend a complete reorganization package to Beggs.



Extending the Shuttle's Reach

An Earthbound version of the Remote Manipulator "arm" which will fly on STS-2 is shown being put through its paces in the Manipulator Development Facility in Building 9A. Astronauts train on this equipment to gain proficiency in maneuvering the arm to grapple payloads in the Orbiter's 60-foot bay.

Power Line Routing Aided By NASA Satellite Information

Pacific Gas and Electric Company, which services northern and central California, is using NASA's Landsat satellite data to help decide the often controversial question of where to locate high voltage transmission lines.

In the prime agriculture country of California's Central Valley, the utility is concerned about the impact the transmission lines will have on agricultural production. Practically all transmission lines in the company's service areas must cross some type of farmland.

The impact of transmission lines routed through certain crops is greater than through others. The costs of growing "processing tomatoes" are extremely high, according to William Newland, a digital analyst with Technicolor Graphic Service, a contractor for NASA's Ames Research Center in Mountain View, Calif. "If Pacific Gas and Electric were to run its lines through these tomato fields, the cost of compensating farmers for acreage taken out of production is usually greater than would be the case, for instance, of crossing a grain field," Newland said. "Grapes are another crop type that the utility would like to have mapped. Because grape vines grow on wire trellises, they generally must be grounded if the trellis wires are parallel to a high voltage transmission line."

The utility is using the satellite data to help evaluate the alternative routes for a transmission line between two substations in the San Joaquin Valley.

By using data from Landsat satellites now in orbit, the major crop types that interested Pacific Gas and Electric — cotton, tomatoes, orchards, vineyards and grains — were identified in that area. A detailed land cover image has been generated using Landsat data.

"Because the satellite covers such a wide geographic area, we were able to acquire data that covered all of our alternative corridors," said the utility's Greg Thornbury, who is directing a study of Landsat for use in transmission line siting studies. "It provides a relatively easy way to compare the alternatives within this farming area."

Each of NASA's two Landsat satellites can survey any spot on Earth every 18 days. A multi-spectral scanner on each satellite records differences in Sun reflectance from Earth surface features. The scanner takes four readings (four spectral bands) for each 1.1 acre area on the ground of reflected visible and invisible (infrared) light images. The intensity levels of this light are then converted to film images and computer compatible tapes at stations on Earth.

Landsat data from May, July and August, 1979, were used. Supplied with ground truth data collected by California's Department of Water Resources and Pacific Gas and Electric from selected areas of the Fresno region, the analysts studied one-mile by one-mile segments containing the crops PG & E wanted to identify to determine signatures for these cover types.

Bulletin Board

Bicycle Club

The JSC Bicycle Club is offering a free one-year membership for the best club logo submitted prior to December 7, 1981. To enter, send your sketch along with your name and phone number to Brian Morris, EP6. The winner will be determined at the December 7 club meeting held in the Building 350 conference room at 5 p.m.

Astronomy Seminar

The JSC Astronomy Brown Bag Seminar is held every Wednesday from noon to one in the conference room 193 of Building 31. Topics later this month include Wendell Mendell's report on the Division of Planetary Science Meeting, and the Views of the Stromboli Volcano October 28 by Paul Maley.

Museum of Fine Arts Plate

The Museum of Fine Arts is issuing a commemorative plate featuring E. M. "Buck" Schwartz's drawing of Bayou Ben, circa 1954. The plate will be designed and produced by Mottahedeh, designer of President Reagan's inauguration plate. Cost of the plate is \$35 and proceeds will benefit the museum. A sample can be seen by contacting Lois Miller in Building 45, room 256, ext. 6267.

Autograph Parties

Jim Oberg, an employee of McDonnell Douglas at JSC and author of books "New Earths," and "Red Star in Orbit" will be signing copies of the publications October 22 from 11:30 a.m. to 1 p.m. and 7 p.m. to 8 p.m. at Allen-Maxwell Books in Nassau Bay Shopping Center, and October 31 from 11 a.m. to 1 p.m. at Waldenbooks in Baybrook Mall.

RC Airplane Fly-In

On October 31 and November 1 from 9 a.m. to 5 p.m. the JSC Radio Control Club will sponsor a scale contest/fly-in. Size of the planes will range from quarter-scale (8-foot wing span) to 1/2A (2-foot wing span). The types of planes expected are WWII fighters, jets, bi-planes and commercial planes. Spectators are welcome.

AIAA Dinner Meeting

The Houston Section of the AIAA Tuesday, October 20, will hold a dinner meeting at the Gilruth Recreation Center. Topic of the program is "Air

Transportation — The Next 100 Years," by R. H. Hopps, vice-president and general manager of commercial programs of Lockheed, California. Social hour begins at 6 p.m. with dinner at 7 p.m. and the program at 8 p.m. For reservations at JSC call Nancy at x3995.

Lunarfins

The JSC Scuba Club, the Lunarfins, will feature in its meeting Wednesday October 21 a program describing an archeological scuba diving expedition made by three members of the club. The June 1981 expedition was sponsored by CEDAM, an international archeological organization,

and occurred in the Caribbean waters off Belize, Central America. The public is invited to the meeting which begins at 7:30 p.m. at the Clear Lake Park Building, NASA Road 1. For more information call 480-1340 evenings.

UHCLC Community Orchestra

The University of Houston, Clear Lake City Community Orchestra October 30 will present "A Children's Concert on the Eve of Halloween." The concert begins at 8 p.m. at the Clear Lake High School Auditorium. Adult tickets are \$3, students and senior citizens \$1. For more information call W. F. Meek at ext. 4851.



Dotts Recognized for Tile Densification

Former Director of Engineering and Development at JSC Max Faget presents a cash award to Robert L. Dotts of the Thermal Technology Branch for his work in developing the densification process for Shuttle thermal protection tiles. The process involves impregnating the bonding surface of the tiles with a liquid suspension of ludox and fine silica powder and then hardening the surface, preventing the expense of replacing the low strength tiles.

Cookin' in the cafeteria

Week of October 19-23, 1981

Week of October 26-30, 1981

Monday: Cream of Chicken Soup; Beef Burgandy over Noodles; Fried Chicken; BBQ Sausage Link; Hamburger Steak (Special); Buttered Corn; Carrots; Green Beans. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Beef Noodle Soup; Baked Meatloaf; Liver w/Onions; BBQ Spare Ribs; Turkey & Dressing (Special); Spanish Rice; Broccoli; Buttered Squash.

Wednesday: Seafood Gumbo; Broiled Fish; Tamales w/Chili; Spanish Macaroni (Special); Ranch Beans; Beets; Parsley Potatoes.

Thursday: Navy Bean Soup; Beef Pot Roast; Shrimp Chop Suey; Pork Chops; Chicken Fried Steak (Special); Carrots; Cabbage; Green Beans.

Friday: Seafood Gumbo; Broiled Halibut; Fried Shrimp; Baked Ham; Tuna & Noodle Casserole (Special); Corn; Turnip Greens; Stewed Tomatoes.

Monday: Chicken Noodle Soup; Weiners & Beans; Round Steak w/Hash Browns; Meatballs & Spaghetti (Special); Okra & Tomatoes; Carrots; Whipped Potatoes. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Beef & Barley Soup; Beef Stew; Shrimp Creole; Fried Chicken (Special); Stewed Tomatoes, Mixed Vegetables; Broccoli.

Wednesday: Seafood Gumbo; Fried Perch; New England Dinner; Swiss Steak (Special); Italian Green Beans; Cabbage, Carrots.

Thursday: Cream of Chicken Soup; Turkey & Dressing; Enchiladas w/Chili; Weiners & Macaroni; Stuffed Bell Pepper (Special); Zucchini Squash; English Peas; Rice.

Friday: Seafood Gumbo; Baked Flounder; 1/4 Broiled Chicken w/Peach half; Salisbury Steak (Special); Cauliflower au Gratin; Mixed Vegetables; Whipped Potatoes; Buttered Cabbage.

Roundup deadline is the first Wednesday after publication.



The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees.

At Gilruth Rec Center

Defensive Driving - Learn to drive safely and qualify for a 10% reduction in your auto insurance for the next 3 years. Class meets from 8:00 am - 5:00 pm on Saturday, October 31. Cost is \$15.00 per person and space is limited. For information call x3944.

Country Western Dance Class - This popular class is again available beginning 2 Nov. Beginners dance from 7:15-8:45 pm and advanced from 8:45-10:15 pm. Cost for the course is \$20.00 per couple. Limit is 15 couples per class. For information call x3944.

Beginning Watercolor Painting - Learn the basics of watercolor painting in this 6 week course that begins on Tuesdays, Nov. 3. Class meets from 7:00-9:00 pm and cost is \$20.00 plus your own materials. For information call x3944.

Makeover Class - Get ready for the holidays with this "step by step to a New You" class. Subjects covered in this class include poise, imaging, posture and movement and make-up. Cost is \$35.00 per student and this 6 week class begins Tuesday, Nov. 3 from 7:00-8:30 pm. Cost includes textbook written by the instructor. For information call x3944.

Arts & Crafts Sale - Do you Christmas Shopping early - at the first Annual Arts and Crafts sale at the Gilruth Rec Center. All types of homemade and handmade items will be on sale. Time of the show is 9:00 am - 3:00 pm, Saturday October 24. Food will also be available and admission is free. Also, a limited number of tables are available. Call x3944 for more information.

Halloween Dance - Get your tickets now at the Building 11 Exchange Store for the Halloween dance at the Gilruth Rec Center on 30 Oct. 7:00 pm is social hour; 8:00 is BBQ dinner and 9:00-1:00, you can dance to the exciting sounds of the South Band. Also featured is a costume contest with prizes. Tickets are \$10.00 each and sales end on 27 October.

Children's Halloween Party - Keep the kids safe on October 31. Have them attend the Gilruth Halloween Party from 6:30-9:00 pm. Featured events are the Spook Spectacular, a series of short films, popcorn, coke, treats and a costume contest with prizes in the various age groups. Cost is \$1.00 per person and tickets are available at Bldg. 11.

Halloween Fun Run - Sign up now to run in the 1st Annual Halloween Fun Run at the Rec Center. Start time is 7:00 pm on October 30. Medals to the top finisher in each age group. Trophies to best costumes. Cost is \$5.00 per person and t-shirts will be given to first 300 entrants. Refreshments will be served after this 5 km race. Call x3944 for more information.

JSC Exchange Store (Hours 10 AM to 2 PM)
Plitt Theatre Tickets — \$2.25 each
General Cinema Tickets — \$2.40 each
Astroworld/Six Flags Tickets — \$9.50 each
Postage Stamps/18 cents, Books — \$3.60 each



**People Helping People
The United Way**



Worker-Trainee Graduates

The eighth graduation class of the Worker-Trainee Opportunities Program were presented with certificates by Jack R. Lister, Personnel Officer, on Wednesday, September 23. Pictured left to right are: Cheryl Joiner, Maria Garza, Carla Whitfield, Denise Green, Martha Glenn, Rose Sowell, Linda Ellison, and Freda Lowe, WTO Coordinator/Instructor. The Worker-Trainee Opportunities Program was created by the Office of Personnel Management to afford the opportunity for certain clerical employees to become members of the Federal workforce. OPM requires that each WTO trainee attend classroom training during the year's program. Trainees are in class one-half day each week, studying business English and typing.

Engineering Teams Recognized for Work

JSC Director Dr. Christopher Kraft September 18 presented awards to three groups in recognition of their engineering efforts.

Forty-six members of the Shuttle EMU/POS High Pressure Oxygen Test Team were honored for their work in "planning the test program, preparing the high pressure oxygen test facilities and successfully conducting the Shuttle Extravehicular Mobility

Unit/Portable Oxygen System oxygen compatibility tests."

The Manned Maneuvering Unit Thermal/Vacuum Test Support Team, 220 members, was recognized for "conceiving, planning, directing and performing the activities which led to and culminated in the successful testing of the Manned Extravehicular Mobility Unit in the JSC Thermal Vacuum Chamber."

The 226 members of the

Shuttle Extravehicular Mobility Unit Thermal/Vacuum Test Certification Team were cited for "conceiving, planning, directing and performing the activities which led to and culminated in the successful certification testing of the Manned Extravehicular Mobility Unit in the JSC thermal vacuum chamber."

Both civil service and JSC contractor personnel were recognized in the awards.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Properties & Rentals

For rent: Galveston By-The-Sea Condominium. Two bedroom furnished apartment for rent by day, week, or month. Clements 474-2622.

For rent: CLC/Oakbrook; 3-2-2, lots of trees. \$475 plus deposit Bill x6136/488-1410

For sale: House Lubbock, Tx. near campus, 3 bedrooms, utility room, approx. 1100 ft. fenced yard, patio, trees, priced to sell. \$29,950. Bernard 333-2968/x4461.

Two large lots, Lake Livingston. Clubhouse, pool, tennis courts across street. \$4000 equity, assume balance at 9-1/2 percent. Call Linda x2569/422-5123 after 6.

For rent: One furnished bedroom in a 3 bedroom house to conscientious and non-smoking male. 6 miles from NASA. All bills paid. \$160/mo. call Jeff x7429/482-5393.

Lease: League City, 3-2-2, near I-45. Immed. occup., carpet & drapes, \$450 & \$200 dep. after 5, 332-1032/x4981 Bob.

Wanted: rent or lease unfurn. or furnished 3 br. near NASA. French visiting scientist. No pets Dr. Lambert 483-5171.

Cars & Trucks

'78 Chev. Monza sta. wg. 4 speed, V-6, a/c, p/b, p/s, luggage rack, 22,000 mi. exc. cond. below blue book, Glover x4726/334-2317.

1973 Dodge Challenger excellent condition \$4,000. See to appreciate. Serious inquiries only. Richard 726-0591.

Wanted: Chevrolet pick-up 1973-1980. Must have power steering, power brakes and air. Call Chuck after 5:30, 487-2978.

For sale: 1975-1976 shop manuals for Ford products volumes 1 thru 5. Fred x5555.

'78 Ford Futura 2 door, auto, radio, ac, etc. 946-4286.

1977 Plymouth Grand Fury Brougham. Cruise control, air, good condition. \$1,350, 334-3227.

1979 Mustang "Ghia", V6, full power, tilt wheel, cruise control, TRX pkg., AM/FM/Tape, white leather interior, vinyl top \$4900. 488-1326 after 5 p.m.

'74 Chevrolet, Impala. Air, auto trans, power brakes and steering, radio, good condition, \$1275, 333-4669.

'78 Chevy Monza V-6, 4spd., ps, pb, a/c, 33,000 mi. good cond. \$3200. Robinson x3918/482-6021.

1973 Toyota 4-door station wagon, a/c, radio, good condition. \$1500. Contact Ken Bown x2948/484-1847.

'73 Plymouth gold duster, 318 cu. in. V-8, regular gas. Best offer. Call Bill at 488-5660/x338 between 7:30 a.m./3:30 p.m. wk. days.

Two sets steel radial tires Goodyear RWL P225/70R15, 5000 miles left, \$50. Goodrich 3/8" WSW GR70-15, 1000 miles left. \$100 Dave x2208.

'76 Bonneville, 2 dr., landau top, mag wheels, loaded, am/fm 8 track, burgundy velour interior. Call 528-6383 (921-0542 after 6).

1972 914 Porsche. New tires, body good, mint interior. Will take \$2500 or trade for comparable motorcycle. George King x7428 Ell/488-7172.

1970 Ford LTD Interior very good, new tires, p/s, a/c. Doesn't need anything. Call Allgeier 488-0397 after 5:30, \$650 firm.

1969 Camaro RS. Blue imron paint, gold pinstripes. Black interior, new T/A radial. Written appraisal \$5000 asking \$4200/best offer.

'76 VW Bug, new tires, battery, paint. \$2500. See in lot west of bldg. 45. Call D. E. Jackson x3734.

1979 Chev. Monte Carlo, 43,000 miles balance \$3,697, assume notes. x6267.

1976 Datsun 280Z, excellent condition. \$5750 negotiable 484-1794.

1972 Postal Jeep new paint runs great, dependable work car. \$1500 or best offer 473-0607 after 4 p.m.

'72 Monte Carlo A/C AM/FM, stereo 8 track Exc. cond. \$1495 x6208/333-2132.

'81 Toyota Tercel, SR-5 A/C AM/FM cassette, new, \$7995. Keyes x6208/333-2132.

1970 Ford 1/2 ton pick-up, good engine, has two new tires. Asking \$1,000, 534-4729/x3729.

'78 Thunderbird, attractive bronze & brown, well-maintained, \$3950 (\$800 below retail), x5111/538-1669.

'71 Toyota Mark II, air, FM-AM, excellent condition, new paint, one owner, complete maint. records, \$2100, 482-9061.

Stereos & Cameras

Curtis Mathis entertainment center, stereo, 8 track tape, reel to reel, microphone, non-working color T.V., AM/FM radio, must sell owner moving. \$75, 471-8556.

Canon FT QL 35mm camera w/35mm 50mm, 50mm macro, 85mm, 200mm, UV filters, auto bellows, side dupli., light meter booster, aluminum carrying case, \$425. David x2886/485-1705.

Heathkit GR-295 color TV set, 23 in. tube, solid maple cabinet, works great \$225. Joe x3576/944-7042.

Radio Shack, 12 volt 8-track tape player and two speakers for car, \$15. Stand alone turntable with 4 watt stereo amp and 2 separate hi-fi speakers \$25. Stand alone turntable with 4 watt stereo amp, speaker plug-ins but no speaker, \$15. Call Dot, 334-2902.

Sony Trinitron, 17" color, \$195, 482-9061.

Musical

For sale: Banjo, with carrying case. \$100. Merriam 483-2855 or 488-3806.

Hammond M-100 Spinet Organ. Drawers, Presets, Pedals, Reverb. Excellent mechanically and electrically, needs facelift. \$900. Leslie 147 Tone Cabinet \$300. Don Amann x2425/333-2359.

Wanted: Inexpensive amplifier for electric bass guitar. L. Jenkins x2478/946-0819.

Wanted

Would like to buy heavy duty rocker to rock new grandson. Tomkins x6291.

Space Shuttle Team Member license plates holders or info. on how to get them. Carolyn x5378/480-2896. 4 x 5 view camera — even old clunk needing repair. White, x5111/332-5177.

Boats & Planes

Chrysler 16 ft. boat (68) and 90 hp. motor (77) with Shoreline galvanized trailer \$1895. 333-2182.

18' Vanguard Volant racing sailboat. Spinnaker and launcher, trap-eze, furling & jib, covers and trailer. \$5000, Tony x2411.

Carpools

One or more persons to ride in a car pool from the northwest side of Houston off of Hwy 290. Call after 6 p.m. 686-8509/681-1512.

Carpool wanted from Westbelt of I-10 to Hwy 45. Caston Hunt x6313.

I am interested in joining a carpool from the Memorial-Dairy Ashford area. Please contact Marvin fox, 333-3133.

Would like to form vanpool from I-10 East and Federal Road, and from Metro Park and Ride, I-45, 8:00 to 5:00.

Elli Johnson x3841, or Bert Brockman, CSC, 486-8153, x204.

Need to form/join a carpool from Sugarland/Missouri City area via Hwy. 6. Please call Bob Want x4171.

Cycles

Honda Passport, 1981, \$800. Includes windscreen, helmet, gloves, 480-2367 after 4 p.m.

Suzuki '73 ST250, good cond. very low miles, extras, \$500, 471-5161 after 7 p.m.

Honda XR-185, 1979, excellent condition. \$650. Eve. 482-2551.

Honda XR-250, 1979, licensed, excellent condition. \$750. Eve. 482-2551.

1981 Honda Passport motorbike with helmet, gloves & windshield \$800. 480-2367 after 5 p.m.

1974 Kawasaki no papers, good for parts. \$150. 480-7200.

Household

Plush wine couch \$400. Contemp. coffee/end tables, set \$150. Solid wood coffee table, black, \$75. Dickinson. 337-5249/x7474.

Whirlpool compact washer and dryer, with stand. Both look new, dryer works perfectly, washer needs timer. \$175 for all 488-8537.

For sale: \$100 2 rooms of beautiful red carpet, excellent condition, 11 x 11 & 12 x 15.4 Hallway carpet free with sale. 333-2368.

Dining table, swivel chairs, beautiful mahogany formica top, looks like new, no wear, \$150. 554-6673.

Pets

Free puppies, Weimaraner, part Lab. Good sporting dogs and are used to children. Sid 488-3378/Carolyn x5378/480-2896.

For sale: 1 dwarf Netherlands rabbit, silver gray, with cage and food. Child's house pet; family moving. x3912/488-5446.

Toy Train Finds Its Place in the Space Program

ENGINE

I wonder if the engine
That dashes down the track
Ever has a single thought
Of how it can get back.

Harry Erwin, NASA microwave expert, aimed his invisible pin-thin laser beam at the bicycle reflector mounted on the smoke stack of the Lionel toy train, energized the computer, and switched the engine to "full speed".

ZAP? NO!

Two-hundred-fifty feet down the rails, the electric engine, drawing a three-car load (without a little red caboose) rolled forward. The com-

puter display recorded 5 feet per second, give or take 1/10th of an inch per second; distance, 151 feet, accuracy to a fraction of an inch.

Erwin, head of Johnson Space Center's Microwave and Laser section, was in the midst of a rendezvous and docking hardware experiment, analyzing different types of laser-tracking systems.

To carry out the test series, he had requested, much to the bewilderment of NASA Procurement, an electric train set, requiring a high smoke stack (to accommodate a reflector) and 300 feet of railroad track.

With fifty cars behind it
And each car loaded full,

I wonder if it ever thinks
How hard it has to pull.

Although it was near Christmastime (1980), backup paperwork had justified the request. The toy train, Erwin explained, was the effective and inexpensive way to test the laser system's ability to measure speed and distance between two moving targets. So Helon Crawford, NASA buyer, ordered a Lionel train, The (Jesse) JAMES GANG model produced by Fundimensions, a division of General Mills, Detroit. The toy department of La Porte Hardware Co. (Texas) happened to have one on its shelf. The train and 300 feet of track cost \$300.

Erwin then requested a small, lightweight, low-powered laser and computer system that could measure speed and distance accurately between two parked or slow-moving objects. Because, Erwin explained, the Space Shuttle orbiter or other systems in space such as the Space Operations Center would some day need to dock. Softly!

"Two parameters we must measure very accurately are velocity and distance at close range," said Erwin. "That rules out existing rendezvous radars which can track a target accurately at long distances, but lose it close in."

A typical radar picks up targets 300 miles out, tracks accurately to 300 feet, where another system must take over.

"It's the final closing 300 feet or so that needs a precise measuring system, one that accurately measures speed and distance at a crawl," said Erwin. "We think we can do it optically."

The search then narrowed to a newly-marketed, low-powered diode laser system that sends light energy modulated with ranging tones. The light energy bounces off the reflector back to the laser's receiver where the computer processes and calculates the time it takes to make the round trip.

One of the first built, the laser diode, about the size of a grain of salt, converts electrons to photons, resulting in an infrared laser beam. The beam, about a millionth of a watt, is visible only through a special image converter.

The laser experiment is being conducted in a blackened 15-foot-diameter steel tunnel to model the lighting conditions that may exist in space docking. Once the diode laser rendezvous and docking technique is perfected, a more powerful carbon dioxide laser beam will be installed to confirm the diode system's accuracy and help set a standard.

If all goes well, says Erwin, an electrical engineer who has been with NASA 16 years, the minuscule beam of light may guide hundreds of tons of metal to a powder-puff-soft docking in the blackness of space.

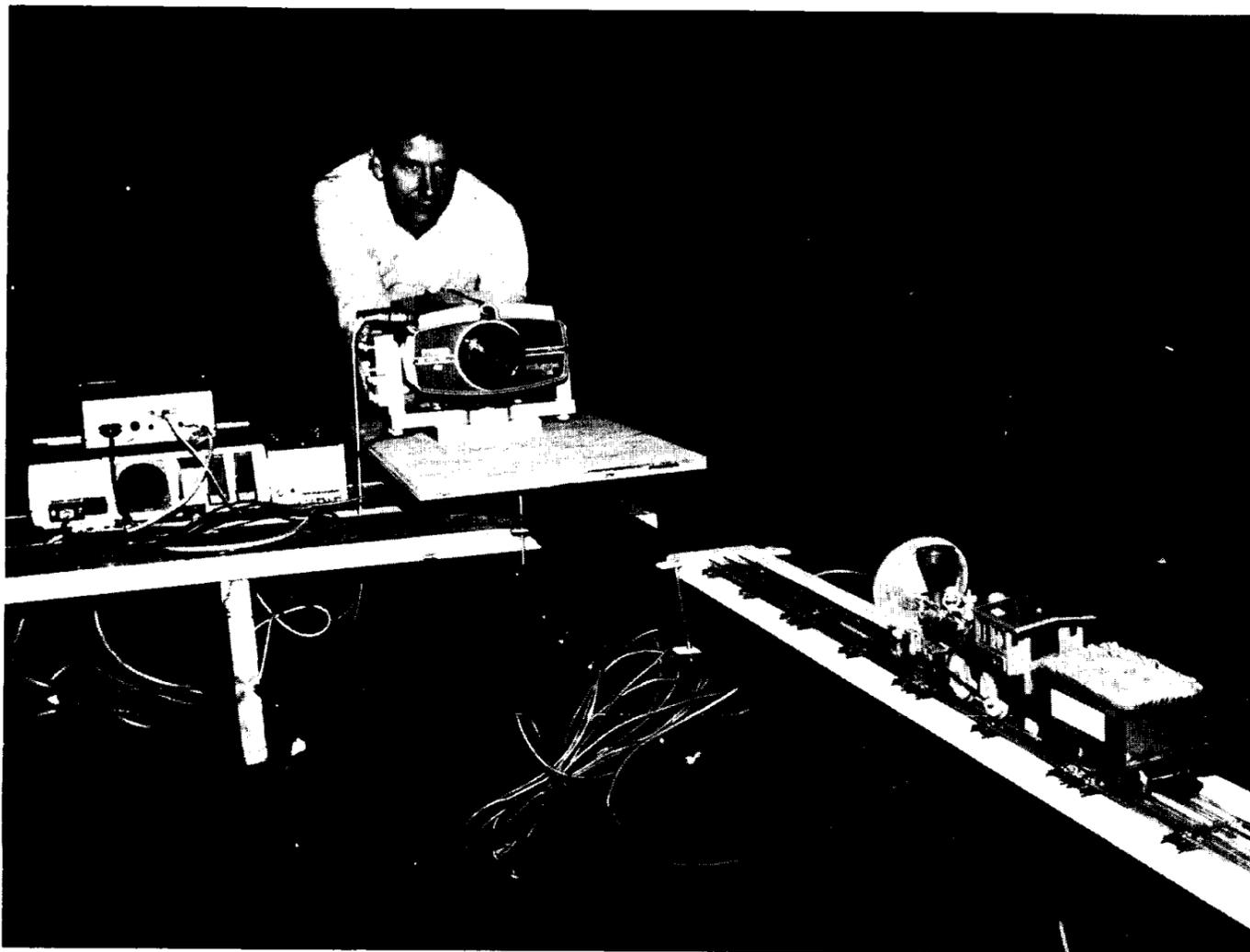
I guess it trusts the fireman;

It trusts the engineer;

I guess it knows the switchman

Will keep the tracks clear.

—James S. Tippett



Little Engine That Could

You might expect to find a scale model railroad like this one in someone's recreation room, but this one found a home as part of an experiment to develop laser docking equipment. Harry Erwin of the Microwave and Laser Section in Engineering and Development aims the laser source at the reflector atop the train's smokestack and tries to pretend he's not enjoying himself.

Langley Research Center

NASA Tests Improve Light Plane Safety

Researchers at NASA's Langley Research Center, Hampton, Va., trying to enhance flight safety, are helping to make light planes inherently stall and spin-resistant.

Aircraft safety and efficiency is the focus of work at Langley and NASA's other leading aeronautical centers — Ames Research Center, Mountain View, Calif.; Dryden Flight Research Center, Edwards, Calif.; and Lewis Research Center, Cleveland.

During the past decade, more than 100,000 Americans were involved in more than 39,000 light plane accidents, according to a recent report by the National Transportation Safety Board.

Nearly one in four of those accidents are believed to have been due to loss of control after the planes were either purposely or accidentally maneuvered into a stall or spin.

One promising development in stall and spin prevention research is the rediscovery of the canard — a miniature wing that sprouts from the aircraft nose area.

The canard is the most recent focus of a NASA research program aimed at making light planes safer.

Joe Chambers, assistant chief of Langley's Low-Speed Aerodynamics Division, strongly believes that "the aircraft tail-first, canard configuration is the shape of light planes for the 1990s.

The potential advantages of some of these far-out looking canard-configuration aircraft are very promising, both in terms of safety and efficiency.

The canard was first proven effective by the Wright brothers at the turn of the century. Since then, it has been largely neglected due to early patent considerations and occasional flight handling problems.

The rebirth of the canard is being hastened by the booming market in home-built airplanes. Several designer-manufacturers are selling airplane kits to the public that include this forward, horizontal wing surface, in part because of fuel efficiency.

A demonstrated safety advantage, however, is what intrigued Langley researchers when they approached the designer of the VariEze, a novel-looking home-built airplane with canard, no horizontal tail, and a rear propeller engine. Constructed and flown by more than 400 kit builders in

the United States, this two-seater (and others similar to it) have amassed an impressive stall-spin safety record.

A stall — loss of wing lift and, thereby, loss of aircraft control — generally occurs at low speeds and at certain flight attitudes, though stall can occur at any speed with gross and abrupt control inputs. A stall can cause a plane to veer sharply off course and out of control into a spin. Spins in some airplanes are unrecoverable.

Tests of a VariEze scale model in Langley's Spin Tunnel confirmed that, properly "loaded," the plane is virtually impossible to spin.

Its unique configuration, a combination of canard and narrow, swept main wing with vertical "winglets" at the wing tips, has a built-in resistance to aircraft stalling or spinning. Winglets, an invention of Langley's Dr. Richard Whitcomb, have already proven to be a fuel-efficient concept.

Another series of tests, however, revealed a problem already experienced by several VariEze owners under certain specific conditions that can result in a lateral stability prob-

lem. In "free-flight" tests in Langley's 9-by-18-meter (30-by-60-foot) Wind Tunnel, at low speeds and with the nose high, a model flew with a violent rolling oscillation, or wing rock. After study, researchers solved the problem with a simple modification of the main wing. Burt Rutan, the creator of the VariEze, immediately conducted a full-scale flight test with a modified wing, found it had indeed solved the problem and promptly recommended the change to all VariEze owners.

The last phase of wind tunnel testing planned for the VariEze has recently been completed in the wind tunnel. A full-scale VariEze, built in Langley's model shop, contributed detailed data about the complicated relationship of canard and wing replacement, and their thickness and shape.

"We're also correlating this experimental wind tunnel work," Chambers says "with computer codes to predict flight characteristics and hope, ultimately, to end up with a 'cookbook' for designers which can be used to quickly and easily design advanced configurations."